About Business Engagement (Top 200, Next 1000 & SMEs)

The Top 200 Programme targets the approximately 200 companies who use the top 70% of business energy in New Zealand (Figure 1). They are generally industrial businesses with a lot of process heat. The purpose of the Top 200 programme is to directly engage with businesses in a holistic manner, building long-term relationships that enable engagement with managing decision makers and internal operational staff to better achieve efficiency and renewable energy improvements.

The Next 1000 Programme aims to access energy efficiency and renewable energy benefits indirectly without the same resource intensive one-to-one approach. The Next 1000 Programme targets the next tier of mid-sized energy users in New Zealand on a project-by-project basis. These businesses are mainly in the commercial sector. Engagement with businesses is led by energy management service providers (Programme Partners) accredited by the Energy Management Association of New Zealand (EMANZ).

For the remaining small to medium enterprises (SMEs), EECA provides online information and tools for improving energy efficiency. EECA also works through some industry associations to provide additional sector-specific information and case studies.

Conclusions

The direct engagement model embodied in the Top 200 Programme is a successful intervention. It is delivering (or has contracted to deliver) significant energy savings and greenhouse gas reductions which have exceeded the programme's investment objectives.

It is early in the Top 200 Programme's lifecycle and the intervention logic outlines greater potential in the future. For example, EECA continues to establish partnerships with Top 200 businesses, many of which are in carbon-intensive industrial sectors.

The role for government intervention in this market would be strengthened further if the programme focused on explicit strategies to target those market changes with the greatest national benefit (e.g. carbon reduction and productivity), and then measure that change. This would not inhibit selling the private benefits of energy efficiency to New Zealand businesses in order to "gain entry" to decision making, and as a consequence, realise the public benefit.

The Top 200 and Next 1000 Programmes (direct engagement and partnership engagement) work as an integrated package of industry partnerships and energy services. The longer-term impact of the Next 1000 Programme is more difficult to ascertain as the engagement with EECA is through service providers and on a project-by project basis rather than through the overarching strategic relationship developed with Top 200 clients.

Small to medium sized enterprises (SMEs) in New Zealand do not represent high energy use, or large potential for related public benefit. The exception is those SMEs who are part of light and heavy vehicle fleets (addressed via other programmes). However, EECA has a statutory obligation to

promote public awareness of, and practices and technologies related to, energy efficiency in New Zealand. The provision of low cost, broad brush information is therefore an appropriate way of fulfilling this statutory obligation. EECA keeps the incremental costs of providing information to SMEs low by leveraging online resources provided to medium-sized businesses. This also supports a level playing field in the provision of information.

Recommendations

Refocus the intent of the Top 200 and Next 1000 Programmes to the current strategic context (carbon reduction and productivity improvement). Evaluate options for these programmes to target these areas of greatest national benefit. Other EECA programmes (e.g. Commercial Buildings and Crown Loans) are tools that can be used in the context of the refreshed NZEECS.

EECA should consider how existing partnerships (created through the Top 200 and Next 1000 Programmes) can be leveraged to motivate other businesses to act (demonstration/diffusion), and so multiply the effectiveness of EECA's investment in these programmes. Consider any linkages to the Ministry of Business, Innovation and Employment and the Productivity Commission's work in this context.

EECA could look to work across government for opportunities to enhance the value of the programmes – for example, priorities under the Emissions Trading Scheme review, climate change policy, and regional growth strategies.

Analyse the value of developing longer term relationships with Next 1000 clients (partnership engagement model) and whether it can be cost effective relative to the Top 200 Programme.

EECA should be ready to engage in broader SME interventions with the Ministry of Business, Innovation and Employment and the Productivity Commission. It could also think about providing a carbon perspective on information provided to SMEs.

Contents

1 The problem

1.1 Problem description

Businesses use 53%[1] of New Zealand's energy and produce 16.8%[2] of total greenhouse gas emissions. Despite this, the Customer Value Proposition (CVP) project[3] suggests 60-70% of businesses are not realising high return (>30% ROI) energy efficiency opportunities despite the fact that they would result in immediate cost reductions. Based on research and experience in previous programmes, EECA estimates that businesses could cost-effectively reduce their energy use by up to 20% per annum. These reductions are not being made because:

- businesses don't know they could be saving more energy
- businesses don't know how to be more energy efficient
- businesses don't value or prioritise energy efficiency – other aspects of the business take priority
- there are perceptions that it is too hard and that they have to give something up to be energy efficient
- there are myths and misconceptions among businesses about how to be energy efficient

1.2 Why is it a problem?

New Zealand is currently ranked 29 out of 34 OECD countries for energy intensity[4]. Furthermore, our rate of efficiency improvement is slower than many countries, which could see us slipping further behind.

This is a problem not only because it leads to higher than needed energy costs for businesses, but also lowers productivity, competitiveness and innovation levels by New Zealand firms in the global marketplace[5]. Depending on the fuel source, it also contributes to higher levels of greenhouse gas emissions, making it more difficult to meet our international commitments.

The largest energy users are in the industrial sector and the bulk of that energy use is in process heat. Process heat is still dominated by fossil fuel use in the industrial sector; It constitutes one-third of New Zealand's overall energy use (193 PJ of total 573 PJ in 2014), and emits 9% of total greenhouse gas emissions. Process heat is made up of 60% fossil fuels, mainly coal and gas. The industrial sector is the largest end-user of process heat – comprising 80% of the total. Approximately 73 of our largest boilers (>20MW capacity) make up 50% of New Zealand's total process heat capacity, and emit over 3 Mt CO_2-e per annum.

[1] Excluding business transport.
[2] Business emissions are 13.6 Mt CO_2e (derived from the Energy Data File and Energy End Use Database) and NZ's total emissions are 81.1 Mt CO_2e (from MfE Greenhouse Gas Inventory).
[3] Summarised in the Large Energy User Pilot Business Case 2013
[4] OECD Environment at a Glance 2015 (http://www.oecd.org/env/environment-at-a-glance-19964064.htm). Energy intensity is energy used per dollar of GDP.
[5] Energy productivity is a critical factor to business competitiveness and innovation.

Process heat use could be reduced by 18.5% in the near-term through cost-effective energy efficiency and fuel substitution measures, resulting in energy demand reductions of 34 PJ and emission reductions of 2.5 Mt CO_2-e. Continuing efforts through to 2030 could contribute to approximately 14% of New Zealand's 2030 climate change target[6] and offer one of the largest cost-effective measures, whilst also assisting industrial competitiveness and productivity goals.

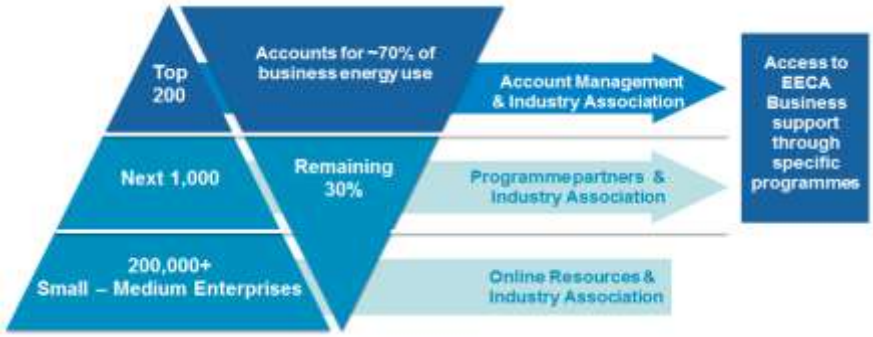
1.3 The programme

The Top 200 Programme targets the approximately 200 companies who use the top 70% of business energy in New Zealand (Figure 1). They are generally industrial businesses with a lot of process heat. The purpose of the Top 200 Programme is to directly engage with businesses in a holistic manner, building long-term relationships that enable engagement with decision makers and internal operational staff to better achieve efficiency and renewable energy improvements.

The Next 1000 Programme aims to access energy efficiency and renewable energy benefits indirectly without the same resource intensive one-to-one approach. The Next 1000 Programme targets the next tier of mid-sized energy users in New Zealand on a project-by-project basis. These businesses are mainly in the commercial sector. Engagement with businesses is led by energy management service providers (referred to as Programme Partners) accredited by the Energy Management Association of New Zealand (EMANZ).

For the remaining small to medium enterprises (SMEs), EECA provides online information and tools for improving energy efficiency. EECA also works through some industry associations to provide additional sector-specific information and case studies.

Figure 1: *Structure of EECA business engagement programmes*



Through the Top 200 and Next 1000 Programmes, EECA and their partners work directly with the biggest users of energy in the business sector to provide information, funding and support to identify and implement energy savings. EECA provides partial funding for both the development of information through energy audits and assessments, and to co-invest in projects that will directly reduce energy use.

[6] Based off total emissions, and does not include the impact of forestry and land use. Using net emissions, the proportion of process heat reduction potential would be much greater.

While the method for engagement is different, the products and services EECA uses are the same for both programmes and are tailored to the needs of a business depending on where it is in its energy management journey (Figure 2).

Businesses with higher energy use are targeted for participation in the Top 200 and Next 1000 Programmes, but the actual agreements and business partnerships entered into depend on where each firm is in its capability and openness to energy efficiency. These firms tend to be spread across the industrial and commercial sectors. The types of firms involved in the Top 200 and Next 1000 Programmes are discussed in more detail under market characteristics below.

Figure 2: *EECA Business products and services*

The Top 200 and Next 1000 Programmes were developed after a thorough problem identification and gap analysis process, and an initial pilot of the programme was completed before it was rolled out more widely. These processes and more detail on the activities under each programme are described in Appendix One.

1.4 Market characteristics

There are three main actors in the business energy efficiency market: large energy users, service providers, and industry associations.

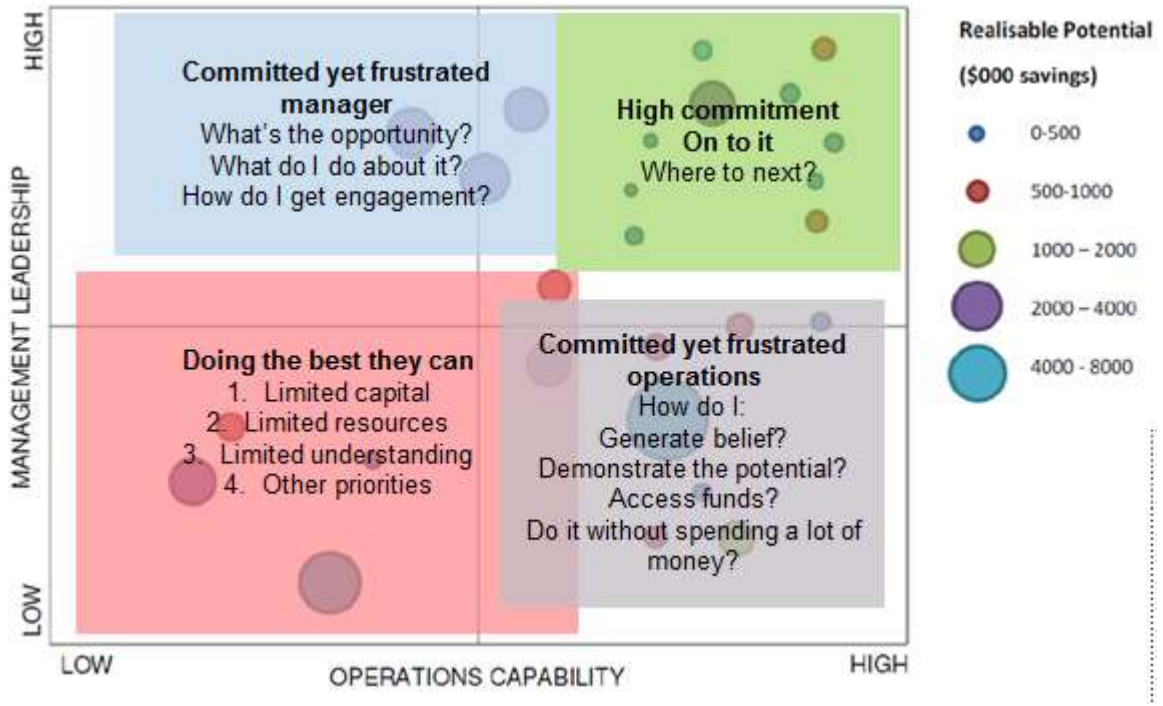
1.4.1 *Large energy users*

The Top 200 largest energy users generally have an annual energy spend of greater than $2.5 million. The characteristics of the market are broad and varied:

- These businesses span a range of sectors covering primary production and manufacturing, heavy industry, commercial buildings, public sector (education, health care, central and local government). The characteristics of these sectors, and in particular public versus private sector, are very different and the approaches to energy management can be very different as a result. Many companies are large exporters and run very small profit margins, such as businesses within the meat processing sector. Most companies are large employers and as such play an important role in local communities and economies.
- Depending on the maturity of the business, approaches to energy management by businesses in the same sector can be very different. For many companies energy can be a small proportion of total costs.
- The majority of businesses prioritise health and safety, production/through-put, growth, cost reduction and quality.
- A large number of these businesses are in overseas ownership which can have a large impact on supply chain management, the budget and approval cycle, site priorities and approach to sustainability (e.g. Chinese owned vs European owned).
- Many of the leading companies are open to sharing information within their sectors and are happy to collaborate on energy efficiency and sustainability between sectors. More and more businesses are starting to regard energy efficiency similar to health and safety.
- Energy management within businesses is driven by engineering capability and an increasing sustainability focus.
- The larger private sector organisations generally have greater access to capital than public sector and primary production clients and often invest very heavily in good practice. This seems to be a combination of:
    - brand related value – their customers value sustainable practice and they have large employment bases, with sustainability creating positive staff morale/value association
    - cost reduction – the 'bottom line' is their core focus and they recognise over two year paybacks on long term energy efficiency investments as wise
    - having a dedicated focus on energy (e.g. energy manager)
- The larger public sector organisations generally have the good intentions and good people, but do not use a business model that allows the function to be successful (annual planning cycles mean there is less flexibility to take up projects that may have a short payback period, but have not been planned for).

The Next 1000 energy users generally have the same characteristics but with lower energy spend and more coverage of the commercial rather than industrial sector.

Figure 3: *Business energy efficiency capability matrix*



The organisational capability of businesses can generally fit within the above capability matrix. The bubbles are individual businesses who took part in the CVP project. The size of the bubbles represents their potential for energy savings. Each quadrant has a set of common organisational characteristics.

1.4.2 *Energy management service providers*

There are a small number of private providers who operate consultancy businesses to provide energy management services to large and medium sized businesses. Service providers include energy managers, engineers, energy auditors, and energy technology specialists. They provide technical advice and deliver on energy efficiency projects in areas including energy audits, energy management planning, monitoring and targeting, motor systems, process heat, compressed air, and lighting.

Consultants include leading professional consulting firms and a number of small companies that face challenges to expand and extend their market research and the diversity of their services.

Most of the larger practices have an extensive commitment to energy efficiency and sustainability worldwide but struggle in New Zealand.

The quality of consultants is variable. The CVP research showed that some consultants are viewed negatively by business due to:

- a perceived lack of independence
- a tendency to absorb in-house resources to get up to speed
- a tendency to struggle with a business' unique technical complexity and

- poor engagement with in-house teams

The market is dominated by technical specialists who can diagnose energy efficiency issues and generally engage at an operational level, in many cases on an ad hoc basis rather than developing long-term relationships. There are a small number of consultants who are adept at selling strategically into senior levels of management. Most commonly, the relationships are at an operational level which will tend to focus on one-off opportunities rather than strategic relationships and broader plans for improvement. Energy management is often sold off the back of energy procurement and bill verification contracts.

1.4.3 *Industry associations*

There are many industry networks and sector groups that influence business energy efficiency.

They include those in energy-intensive sectors, leaders in sustainability and climate change, and training and education providers. The majority of associations are not-for-profit or membership-based organisations that represent the broad views of their sector. Many can struggle to access sufficient, dedicated staff time. s 9(2)(g)(i)

The associations that EECA partners with are:

- Energy Management Association of New Zealand (EMANZ)
- The Sustainable Business Network
- The Sustainable Business Council
- Irrigation New Zealand
- Plastics New Zealand
- University of Waikato
- Target Sustainability (Christchurch City Council)
- The Bioenergy Association
- The Institute of Refrigeration Heating & Air Conditioning Engineers of New Zealand (IRHACE)
- Facilities Management Association of New Zealand (FMANZ).

2 Strategic fit

The Top 200 and Next 1000 Programmes are consistent with Government initiatives such as the Natural Resources chapter in the Business Growth Agenda (BGA). The BGA signals that New Zealand should "Improve energy efficiency and use of renewable energy to raise productivity, reduce carbon emissions and promote consumer choice" (Natural Resources chapter, Focus Area 7).

The Top 200 and Next 1000 also fit clearly into the New Zealand Energy Efficiency and Conservation Strategy 2011-16 (NZEECS) which aims for "enhanced business growth and competitiveness from energy intensity improvements." These programmes contribute to energy intensity improvements by increasing the energy productivity of larger energy using businesses.

Given businesses' contribution to New Zealand's total greenhouse gas emissions, the Top 200 and Next 1000 Programmes support the Government's announced climate change mitigation targets. The Government has agreed on a target for reducing New Zealand's greenhouse gas emissions by

30% below 2005 levels by 2030. The Government's main policy response to reducing emissions is the New Zealand Emissions Trading Scheme (ETS). However, the ETS alone will not drive New Zealand towards a low emissions economy. The carbon price incentive will generally encourage the efficient uptake of opportunities and technologies for reducing emissions; however, in some sectors there may be other barriers or market failures that also need to be addressed. Where the Government can play a useful role, it has implemented policies, targets, and programmes outside the ETS that will contribute to reducing emissions, such as the Top 200 and Next 1000 Programmes.

EECA's strategy prioritises "securing energy and carbon gains across large companies and down value chains, using the influence of business leaders". These programmes are specifically designed to enact this.

3 Role for government

3.1 Market failures and barriers

The role for Government is based on the presence of market barriers and market failures. The barriers to businesses being more efficient with their energy fall primarily into three categories:

- Lack of information and understanding
- Affordability barriers, both real and perceived
- A culture of risk aversion amongst decision makers.

These barriers prevent the market from operating most efficiently, and from taking up opportunities to use energy more effectively.

Since large energy users are often making direct use of fossil-fuels, more efficient use of energy leads to reductions in greenhouse gas emissions. These reductions in emissions are public goods that are not strongly incentivised to come about by the market alone. Greenhouse gas emission reductions represent a contribution towards the Government's international commitments. Encouraging the supply of public goods, and overcoming market barriers to assist the market to work most efficiently provide the role for government action.

Where energy use is less fossil fuel intensive (e.g. commercial sector) the benefits are largely private (reduced energy costs), but these savings contribute towards economic growth and development at a national level, and contribute towards the Government priorities outlined in Section 2.

EECA uses these private benefits to motivate participants to generate public goods. There are public goods in the form of savings of carbon emissions that will be delivered through the programmes.

3.1.1 *Market failures*

Businesses lack the resources or know-how to understand potential reduced energy costs and productivity improvements that could be gained from understanding their energy use. It was also

identified that there are split incentives within these firms, between operational level staff and senior management that prevent energy efficiency from becoming a priority. These market failures discussed further below.

Lack of information and understanding

Market theory assumes all participants have perfect information, but this is rarely the case. Where participants lack information and understanding then there is a role for government in ensuring that they have the information they need to make informed decisions, and to assist them more directly when they lack capacity to deal with that information.

The value of government action in providing information is demonstrated by people altering their decision making and acting differently when provided with information. Since people have limited capacity to seek out information, in particular where they don't know they have information gaps (the "unknown unknowns"), government action is warranted to ensure people's choices are well-informed.

At a firm level, the information gap can be of different types:

- Actual lack of knowledge – not knowing energy efficiency represents an opportunity.
- Actual lack of understanding – not knowing how to achieve energy efficiency.
- Lack of motivation – believing energy efficiency to be too hard and/or not a priority.

Part of the barrier to motivation is that energy, even among large energy users, is not a high proportion of their costs. A firm whose energy use is 20% of their costs, told they can save 10% of their energy use, will only be looking at a 2% reduction in costs.

The Top 200 and Next 1000 Programmes address these barriers directly by working with firms to identify opportunities (including the scale of opportunities) and help them make action plans to lower the barriers to action.

3.1.2 *Market barriers*

Affordability

Affordability barriers can be present when businesses would like to invest in a long-term saving but cannot afford the upfront cost. Within businesses there are constraints on resources (both people and capital), which means energy efficiency projects compete for resources with other strategic priorities within firms. Businesses can be under immense pressure to produce profit as firms focus on surviving in a competitive market. This prioritisation is unlikely to be a market failure (businesses will often be prioritising appropriately for their needs), but the constrained resources remains a barrier to the market working efficiently, since it will result in higher than necessary energy costs. There is a role for government in helping firms overcome these barriers to assist the market to work more efficiently and generate public benefits that would otherwise not be made.

There is a real affordability issue over information, as bringing in an expert to provide relevant, quality information for decision making comes with a cost hurdle. This puts firms off seeking this information, even if the potential savings far exceed the expense. The Government is addressing this barrier by providing funding for part of the cost of information, such as energy audits and energy

management advice. This will lead to a reduction in the business' perception of risk in investing in information.

However, much of businesses' concerns with affordability are about perception of risk and payback, more than a lack of funding. Some businesses who say they cannot afford to be energy efficient will change their mind with sufficient information on the relative costs and benefits. In these cases, the affordability barrier is a perceived barrier rather than a real barrier, and given sufficient certainty that the investment in energy efficiency was worthwhile, businesses will make the investment. Here, the Government is helping businesses to make more rational choices and overcome their inherent biases by providing information.

Culture among decision makers

Management capability in these firms can be low. An aversion to external advisors is common in the industry, particularly amongst the people that typically make decisions in the meat and dairy sector. There is also a potential 'she'll be right' attitude to asset management.

Split incentives

Operational staff and management have different incentives which can prevent the prioritisation of energy efficiency. Operational staff can readily identify energy efficiency opportunities, but are not able to influence management, who tend to have a broader view of an organisation when deciding on capital expenditure.

3.2 Potential benefits

Table 1: *Type of expected benefits*

Public benefits	Private benefits
• Avoided greenhouse gas emissions (primary) • Improved energy security • Improved air quality • Increased national productivity and competitiveness	• Reduced fuel costs

Avoided greenhouse gas emissions – primary public benefit

Improvements to firms' energy efficiency will reduce the burning of fuels, or the combustion of fuel to produce electricity. This directly reduces New Zealand's greenhouse gas emissions.

Improved energy security – public benefit

Reductions in fossil fuel use lower our reliance on imports of fuel and improve our security of supply, should external events interrupt our fuel imports.

Improved air quality – public benefit
Reductions in fossil fuel burned, particularly coal, will lower the amount of pollutants in the air, leading to lower rates of respiratory illness for those in the surrounding area where this is an issue.

Reduced costs – primary private benefit
The primary private benefit of the programme is a reduction in fuel, utility and maintenance costs to participating firms. In addition to the direct benefits, these flow through to increases in productivity and competitiveness and contribute to national economic growth. New Zealand industries face intense pressure from overseas competitors and making more efficient use of their energy helps them to remain competitive.

3.3 Potential costs

There are a range of private providers who provide advice as well as services and products. These programmes are unlikely to be crowding them out as the market is dominated by technical specialists who can diagnose energy efficiency issues, but don't understand the management environment. They struggle to make the case for change to senior management beyond operational staff. EECA understands that this is due to a lack of capacity in the industry which is partially attributable to New Zealand being a small economy.

For the Top 200 Programme, businesses work with EECA account managers, but audits and advice on specific efficiency improvements are delivered through one of the private energy specialists. For the Next 1000 Programme, EECA does not provide account managers, but trains and accredits the private providers to go beyond their specialist area and provide wider advice about energy management. Since EECA is up-skilling the private sector to provide additional services, they are unlikely to be crowding out private providers.

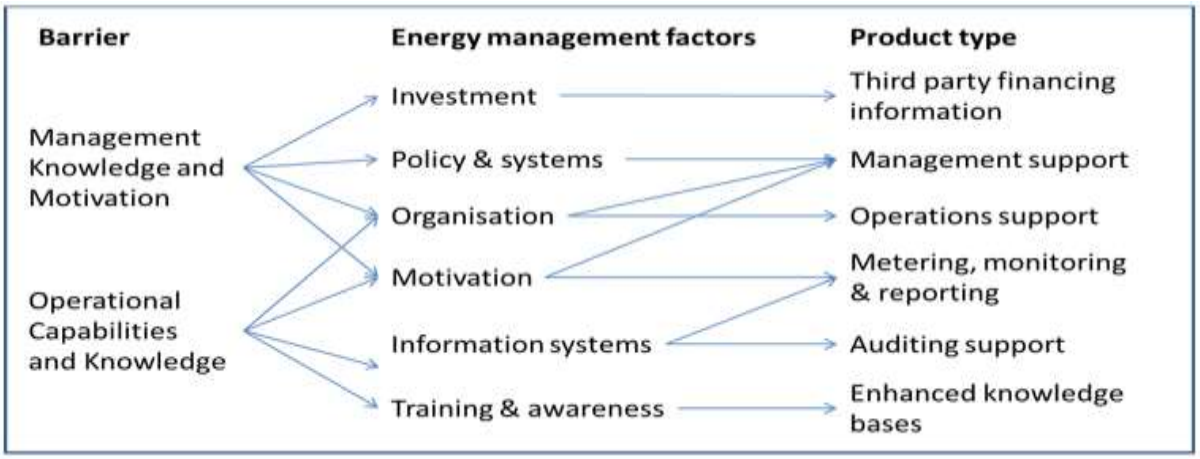
4 Intervention

4.1 Intervention logic

The Top 200 and Next 1000 Programmes encompass a wide variety of interventions. This review has not laid out the intervention logic for each intervention; however, Figure 4 illustrates the logic of the package as a whole. The programmes aim to tailor products and services to the specific barriers and needs of a business (Figure 5).

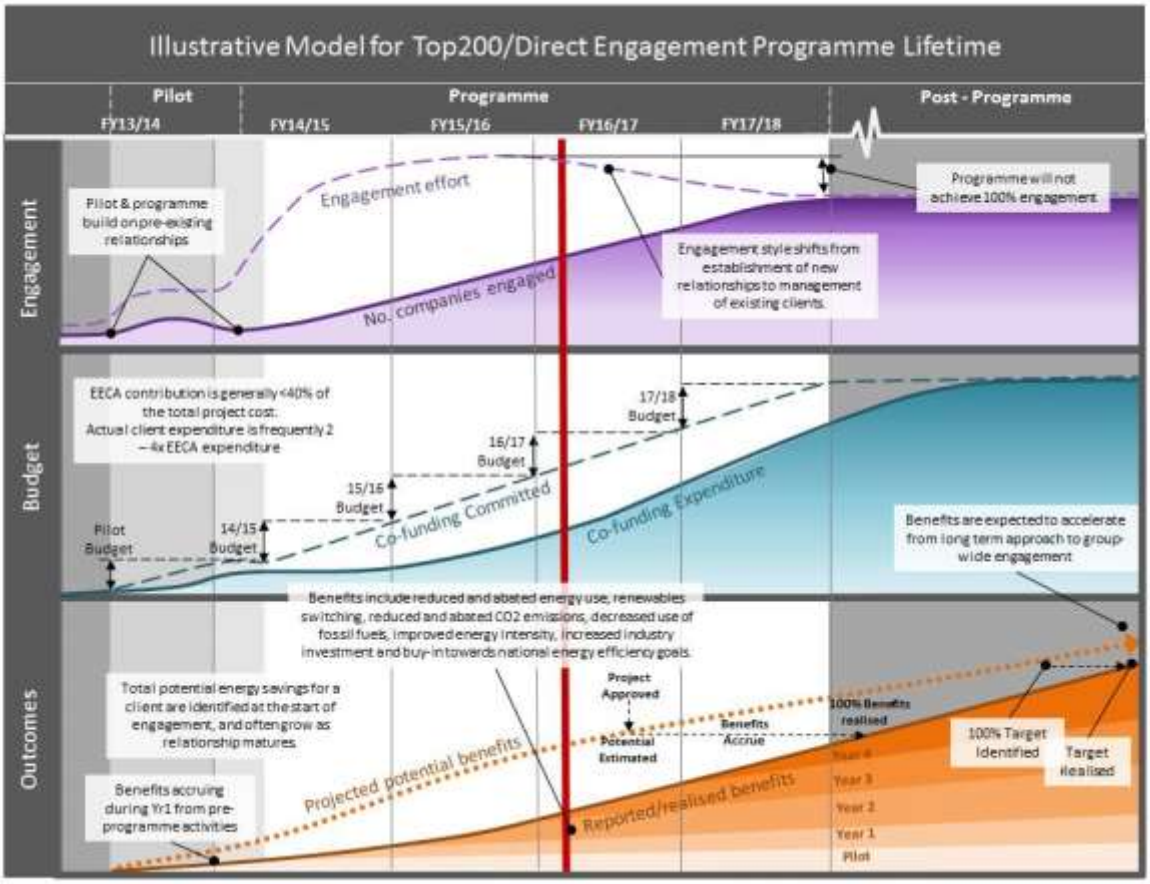
Figure 4: *Expected chain of events of Top 200 and Next 1000 Programmes*

Figure 5: *How specific barriers are addressed through different products and services*



The primary objective of the Top 200 Programme is to lock-in long-term (multi-year) relationships and programmes in order to embed energy management into an organisation. This creates a more sustainable approach to energy management and creates broader benefits compared to an ad hoc project-by-project approach, which generally focuses solely on 'low-hanging fruit' opportunities. This means that there is a high-cost, low-return period at the beginning of the project with greater returns expected in time. The expected phasing and trajectory of the programme is demonstrated in Figure 6.

Figure 6: *Timeline for Top 200 Programme*



4.2 Options

Other options were considered during the development of the initial pilot project. These included:

- The use of leading professional consulting firms and existing service providers as channels. The CVP project indicated that EECA is in a unique influencing position as an independent government agency that cannot be filled by third parties.
- Limiting the level of direct account engagement to existing levels and using the networking and influencing initiative, backed up by enhanced information products to generate demand. It was considered that this was likely to result in lower uptake of services and result in poorer returns.
- Other government policy options that engage large business energy users – informed by international experience – have been identified. The options range from incentives to undertake voluntary programmes, through to more mandatory interventions such as public disclosure of opportunities (e.g. Australia's Energy Efficiency Opportunities Programme). It was not documented as to why these were not considered appropriate.

4.3 Investment objectives

EECA's Statement of Performance Expectations provides targets for the Top 200 and Next 1000 Programmes for 2016/17:

- 0.30 PJ/per annum delivered energy savings.
- Electricity efficiency investments have a maximum cost to EECA of 3.6 c/kWh.

The target of 0.30 PJ per annum each year is conservative and reflects what can be realistically achieved with EECA's available budget and resources, and informed by the estimations of potential and uptake achieved through the CVP research. Electricity efficiency investments must be less than 3.6 c/kWh, based on the assumption that investments are at least half the long-run marginal cost of new generation. This assumes savings for a maximum of 10 years and uses an 8% discount rate.

4.4 Potential impact

The average short term economic potential for large energy using businesses is estimated at between 5% and 10% of energy use (this is based on audit findings, case studies and the findings of the Australian Energy Efficiency Opportunities Programme). This potential equates to between 8 PJ and 16 PJ of energy reductions per year and $138 million and $276 million of potential savings in stationary energy (transport has been excluded) for these businesses annually[7].

The CVP project identified a similar level of potential in the large energy user market with an average 7% realisable potential estimated across the 26 organisations that participated. These organisations account for $500 million of annual energy spend.

If all New Zealand businesses saved 7% of their energy use, that would be equivalent to 21 PJ and 1.36 Mt CO_2e saved out of total business energy use of 305 PJ[8] and business greenhouse gas emissions of 15.4 Mt CO_2e[9].

4.5 Market readiness

The tools and technology required to implement energy efficiency and renewable energy improvements are all proven commercially. An exhaustive list of them can be found on the EECA Business website, but examples include LED lighting, heat recovery, building insulation, boiler tuning, and other types of equipment maintenance. There are sufficient service providers with sufficient technical capability to implement all aspects of the programme. A list of service providers can also be found on the EECA Business website[10].

[7] These figures were calculated during the CVP project in 2013.
[8] MBIE. (2015) "*Energy in New Zealand*."
[9] Excluding transport emissions. MBIE. (2015) "*Energy Greenhouse Gas Emissions.*"
[10] Please note the web tool in the link is in the final stages of being built and is not yet 100% functional (as of December 2016).

4.6 Risks

Table 2: *Risks identified at business case stage of programme development*

Risk/Issue	Impact	Likelihood	Mitigation
Programme does not receive ongoing support from MBIE and/or Treasury.	D	M	Discuss approach on an ongoing basis with MBIE and address any issues as they arise. Continuously monitor and report progress.
Inadequate internal capabilities to achieve results.	S	M	Establish critical strengths for the role, skills gaps and training opportunities. Ensure ongoing performance reviews.
Backlash from service providers to direct engagement with clients	S	L	Engage with EMANZ and service providers active in the industrial sector as part of offer development.
Offers cause conflict with existing EECA offers	SE	L	Relationship managers engaged in offer development to identify issues. Nature of pilot communicated to channels where appropriate.
Lack of capacity of service providers to engage with businesses	S	M	Ongoing discussions with service providers to manage workload. Engage with EMANZ to ensure a diverse pool of providers.
Willingness of business to engage with EECA	S	L	Continue to engage with senior managers and operations staff to communicate the benefits of energy efficiency and create tailored solutions for each business.

(Impact: SE – some effect, S – serious, D – Disastrous. Likelihood: L= Low, M=Medium, H=High)

4.7 Interdependencies

There is a potential dependency between the Top 200 Programme and the Next 1000 Programme. Under Next 1000, EECA trains and accredits energy advisors to go beyond their technical specialty to provide assistance with energy efficiency. The Top 200 Programme uses these advisors to perform more operational functions such as energy audits.

The work with Small to Medium Enterprises (SMEs) is not dependent on Top 200 or Next 1000, since it operates at a less intensive level of interaction.

The Top 200 and Next 1000 Programmes are the targeting and relationship management processes that EECA's business products and services are delivered through. This includes the following projects and programmes delivered by the Business team: NABERSNZ, Crown Loans, Commercial Building Performance Advice, Wood Energy South, and Lower Carbon Meat and Dairy. Changes to the resourcing of these projects and programmes can affect the Top 200 and Next 1000 Programmes and vice versa.

There is a potential interdependency between the ENERGY STAR programme and the Next 1000 Programme. EECA currently has an agreement with the Institute of Refrigeration Heating & Air Conditioning Engineers of New Zealand and the Climate Control Companies Association to raise the standards of installation and maintenance in the HVAC and refrigeration sector. This is likely to result in the accreditation of installers and the ENERGY STAR mark may be used for this.

There will be interdependency between the Electric Vehicles Programme and the business programmes as the existing relationships with businesses are likely to be leveraged. The exact nature of that interdependency is not yet defined.

4.8 Resource allocation

The Top 200 Programme had 11 FTE of resource in the 2015/16 year. The Next 1000 Programme had 3.5 FTE, and SMEs had 0.78 FTE.

EECA costs for the last two years for these programmes are in Table 3 (including FTE costs but excluding overheads).

Table 3: *EECA costs for the last two years ($M)*

	2014/15	2015/16
Top 200	$3.5	$5.4
Next 1000	$4.9	$3.0
SMEs	$0.5	$0.6

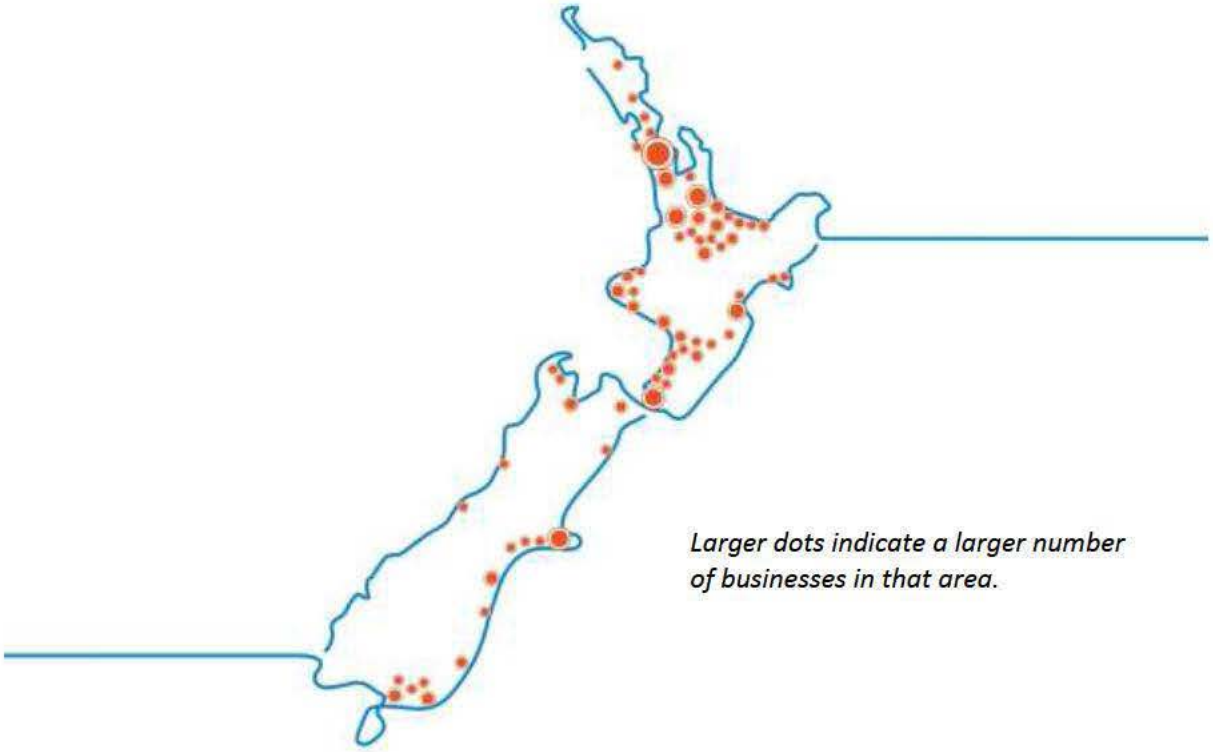
5 Performance

5.1 Effectiveness

5.1.1 *Top 200*

In the 2015/16 financial year, EECA signed new long-term partnerships with 47 Top 200 businesses (against a target of 30), which brings the total number of partnerships to 85 (since 2014). The majority of these businesses are in carbon intensive industrial sectors (covering primary production and manufacturing, and heavy industry) with the remaining in the commercial and public sectors (e.g. education, health care, central and local government). The location of these businesses is shown in Figure 7.

***Figure 7:** Locations of businesses EECA has partnerships with*



Once implemented, these partnerships will result in:

- energy savings of 1.58 PJ each year
- annual carbon reduction of 84,000 tCO_2e
- annual business cost savings of $36m

In addition to the private savings associated with these agreements, the carbon avoided alone is worth $13.6m over the next 10 years[11].

EECA's co-funding appears to be the minimum required and acts as both leverage and door-opener[12]. By bringing funding to the table, it greatly enhances the effectiveness of EECA's information provision, since EECA will be listened to at a higher level when it comes with funding than when it does not. It is also more effective at de-risking investment (or, rather, at reducing the perceived risk) since EECA also has skin in the game. In those cases the contribution from EECA, sometimes as little as 10%, will encourage businesses to change their view of energy efficiency from risky and uncertain to worth doing and leverage much greater private sector investment[13].

[11] Carbon price assumption consistent with other cost-benefit analyses. Assumes the New Zealand0 carbon price rises from the current $18/tonne to the price cap of $25/tonne by 2020 and remains there. Discounted at 7% per annum.
[12] Based on case studies.
[13] s 9(2)(b)(ii) Each project resulted in cost-effective energy and carbon savings.

5.1.2 *Next 1000*

In 2014/15, 170 energy efficiency projects were funded through the Next 1000 Programme. These were made up of Commercial Building Performance Advice (94), audits (37), monitoring and targeting (24), energy management plans (10) and energy systems optimisation (5)[14].

5.1.3 *Small to Medium Enterprises*

There are no performance measures for the SMEs work. It is predominantly material on the website (which is also available to larger businesses) and partnership agreements with industry associations which also serve larger businesses. The partnership agreements are coded as SME costs but serve more Top 200 and Next 1000 businesses than SMEs.

In the 2014/15 year, EECA signed five new partnerships and maintained existing partnerships with four other organisations. The new partnerships were with industry associations (such as Plastics NZ and the Sustainable Business Network) and the University of Waikato. Despite being classified as SMEs these partnerships work across many different sizes of business depending on the activities and memberships of the organisations. The nine partnerships can be classified depending on their purpose (Table 4).

***Table 4:** Current industry association and capability building partnerships*

Type of partnership	Current partnerships
Administrative – building industry capability to work with businesses and deliver energy efficiency projects	University of Waikato – For the creation of industrial webinars and the Graduate Programme (see Appendix One), which benefit energy managers and maintenance staff within Top 200 organisations Energy Management Association of New Zealand – Technical and commercial accreditation of programme partners, utilised in the delivery of projects in the Top 200 and Next 1000 markets
Influential – using membership organisations as loud speakers to disseminate information	Sustainable Business Council (SBC) Sustainable Business Network (SBN) Bioenergy Association of NZ (BANZ) Institute of Refrigeration Heating & Air Conditioning Engineers (IRHACE) Facilities Management Association of New Zealand (FMANZ)
Operational – working with industry associations to find quick wins that can be applied and communicated across a	Plastics NZ Irrigation NZ

[14] See Appendix One for more detail on these interventions.

particular industry	

5.2 Achieved benefits

5.2.1 *Top 200*

The four case studies for the Top 200 that we have considered have had short payback periods of between one and five years and have produced significant energy savings, as well as greenhouse gas savings[15].

In the 2015/16 financial year, the Top 200 created direct annual savings of 0.55 PJ, 34,000 tonnes of carbon and $8.6m energy cost savings for businesses.

5.2.2 *Next 1000*

At this stage, there are no measured benefits; EECA only has committed values for energy savings which are drawn from contracts between Next 1000 businesses and service providers. These commitments total savings of 2.53 PJ and 134,000 tCO_2e over 11 years.

5.2.3 *Small to Medium Enterprises*

Benefits have not been tracked (see Section 5.1.3).

5.3 Value for money

5.3.1 *Top 200*

A cost-benefit analysis has been carried out using energy savings from completed projects and anticipated energy savings from committed projects which have not yet been implemented (see Table 5). The average duration for savings was assumed to be 10 years. Further details and assumptions are in Appendix Two.

***Table 5:** Value-for-money metrics for the Top 200 Programme*

Metric	Value	Comment
Net present value	$156m	
Benefit-cost ratio	4.9:1	The programme returned $4.9 in total benefits to society for every dollar spent by both EECA and private entities.
ROI- Government	0.74:1	Every dollar spent by EECA has generated $0.74 of public benefit.

5.3.2 *Next 1000*

A cost-benefit analysis has been carried out that is based only on committed funding and energy savings recorded for 2014/15 and 2015/16. As it is based on commitments, it is not a true cash flow analysis and makes no judgment on actual energy savings resulting from the commitments (see

[15] Results to date include carbon savings of 2.7kt CO_2-e per annum from three firms. See Top 200 Summary Information. July 2016.

Table 6). The average duration for savings was assumed to be 10 years. Further detail and assumptions are in Appendix Three.

Table 6: *Value-for-money metrics for the Next 1000 Programme*

Metric	Value	Comment
Net present value	$10m	
Benefit-cost ratio	1.44:1	The programme returned $1.44 in total benefits to society for every dollar spent by both EECA and private entities.
ROI- Government	0.28:1	Every dollar spent by EECA has generated $0.28 of public benefit.

5.3.3 *Small to Medium Enterprises*

No cost-benefit analysis has been carried out for SMEs (see Section 5.1.3).

5.4 Programme future

Over the next year, the targeted level of engagement with Top 200 businesses is expected to increase to cover 50% of total business energy use (up from the current 40%). Depending on the make-up of each 'new' business, this would involve almost doubling engagement to around 150 businesses (up from around 85 businesses). EECA is currently negotiating partnerships with this number of businesses.

In addition to increasing EECA's level of engagement, the Top 200 Programme will focus on growing the existing 85 multi-year partnerships it has secured – i.e., transitioning from projects that measure and monitor energy use and identify energy management projects, to implementing projects with higher energy savings. This is known as moving from "hunting to farming" partnerships.

It is expected that the programme reviews will inform the evolution of the Top 200 and Next 1000 programmes in the context of EECA's Statement of Intent outcomes from 2018 to 2025.

6 Lead organisation

The *Energy Efficiency and Conservation Act 2000* provides EECA with the mandate to promote "practices and technologies to further energy efficiency, energy conservation, and the use of renewable sources of energy" in New Zealand. This is what the Top 200 and Next 1000 Programmes are doing within the business sector. In government there is no other agency that more clearly has the capability and mandate to implement these programmes.

There are organisations in the private sector that provide energy efficiency and renewables services to business but none have the independence of government.

The Energy Management Association of New Zealand is an industry association for energy management professionals. It aims to promote energy management skills and good practice. This association is a candidate for leading a programme like this. s 9(2)(g)(i)

s 9(2)(g)(i)

7 Conclusions

The direct engagement model embodied in the Top 200 Programme is a successful intervention. It is delivering (or has contracted to deliver) significant energy savings and greenhouse gas reductions which have exceeded the programme's investment objectives.

It is early in the Top 200 Programme's lifecycle and the intervention logic outlines greater potential in the future. For example, EECA continues to establish partnerships with Top 200 businesses, many of which are in carbon-intensive industrial sectors.

The role for government intervention in this market would be strengthened further if the programme focused on explicit strategies to target those market changes with the greatest national benefit (e.g. carbon reduction and productivity), and then measure that change. This would not inhibit selling the private benefits of energy efficiency to New Zealand businesses in order to "gain entry" to decision making, and as a consequence, realise the public benefit.

The Top 200 and Next 1000 Programmes (direct engagement and partnership engagement) work as an integrated package of industry partnerships and energy services. The longer-term impact of the Next 1000 Programme is more difficult to ascertain as the engagement with EECA is through service providers and on a project-by project basis rather than through the overarching strategic relationship developed with Top 200 clients.

Small to medium sized enterprises (SMEs) in New Zealand do not represent high energy use, or large potential for related public benefit. The exception to this is those SMEs who are part of light and heavy vehicle fleets (addressed via other programmes). However, EECA has a statutory obligation to promote public awareness of, and practices and technologies related to, energy efficiency in New Zealand. The provision of low cost, broad brush information is therefore an appropriate way of fulfilling this statutory obligation. EECA keeps the incremental costs of providing information to SMEs low by leveraging online resources provided to medium-sized businesses. This also supports a level playing field in the provision of information.

8 Recommendations

Refocus the intent of the Top 200 and Next 1000 Programmes to the current strategic context (carbon reduction and productivity improvement). Evaluate options for these programmes to target these areas of greatest national benefit. Other EECA programmes (e.g. Commercial Buildings and Crown Loans) are tools that can be used in the context of the refreshed NZEECS.

EECA should consider how existing partnerships (created through the Top 200 and Next 1000 Programmes) can be leveraged to motivate other businesses to act (demonstration/diffusion), and

so multiply the effectiveness of EECA's investment in these programmes. Consider any linkages to the Ministry of Business, Innovation and Employment and the Productivity Commission's work in this context.

EECA could look to work across government for opportunities to enhance the value of the programmes – for example, priorities under the Emissions Trading Scheme review, climate change policy, and regional growth strategies.

Analyse the value of developing longer term relationships with Next 1000 clients (partnership engagement model) and whether it can be cost effective relative to the Top 200 Programme.

EECA should be ready to engage in broader SME interventions with the Ministry of Business, Innovation and Employment and the Productivity Commission. It could also think about providing a carbon perspective on information provided to SMEs.

9 Appendices

9.1 Appendix One - Origin and detail of the programmes

Origins

Prior to 2013, EECA engaged with businesses through the use of service providers, supported by financial assistance, to drive energy efficiency across a range of end uses (e.g. motor systems, process heat, compressed air, and lighting). These services were supplemented with direct advice and support by EECA Account Managers at an operations level. Capital grant funding was used to reduce barriers that underlie the lack of value and priority given to energy efficiency in business.

In 2013, EECA began a research project (the CVP project) that reviewed EECA's approach to large energy-using businesses. It was initiated to revisit the value proposition for government intervention and investigate approaches that were less reliant on grant funding. In addition, operating experience had shown that the service provider model with financial assistance appeared better suited to medium-sized energy users than to larger energy users.

The project consisted of interviews with 26 large energy users and 23 energy management service providers. The purpose was to improve EECA's understanding of the opportunities, value and barriers associated with improving energy efficiency and the potential role for EECA. The findings included:

- Businesses, even large ones, are not implementing energy efficiency projects that have relatively short paybacks.
- The most significant barriers to realising energy efficiency opportunities are capability barriers:
    - inadequate management capabilities
    - inadequate operations capability
- Information-related interventions that support enhanced knowledge and understanding of best practice energy management were likely to result in improved prioritisation of energy efficiency opportunities.
- EECA's existing approach to businesses addressed some organisational barriers, but required strengthening through direct engagement with senior management and increased account management with operations teams.

Inadequate operational capabilities limit an organisation's ability to understand and properly present opportunities for prioritisation to business decision makers. In addition, management knowledge and motivation has a direct correlation with energy efficiency behaviours and outcomes. Strong management commitment and leadership were highly correlated with positive energy efficiency behaviours and outcomes. These barriers exist within a context of limited resources (e.g. money, both capital and operating expenditure and people) such that energy efficiency is not prioritised above competing priorities.

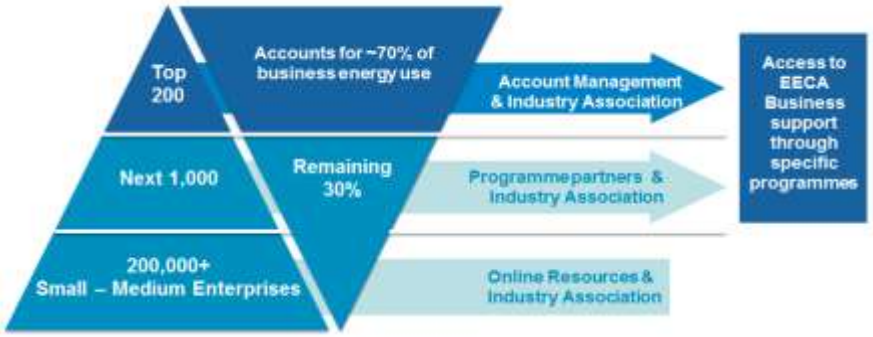
As a result, EECA ran a pilot project from December 2013 to June 2014 which tested a revised approach to large energy using businesses. This consisted of EECA Relationship Managers working directly with senior decision makers to create long term, company-wide energy management

partnerships. The pilot focused on the largest energy users as that is where the greatest potential for energy and emissions savings lies.

The pilot was successful and the approach was rolled out as the Top 200 programme. The Top 200 programme targets the approximately 200 companies who use the top 70% of business energy in New Zealand. They are generally industrial businesses using a lot of process heat.

The Next 1000 programme targets the next tier of mid-sized energy users in New Zealand. These businesses are more in the commercial sector. For these businesses engagement is led by EMANZ accredited service providers (Programme Partners).

For the remaining small to medium enterprises (SMEs), EECA provides online information and tools for improving energy efficiency. EECA also works through some industry associations to provide additional sector-specific information and case studies.



Where service providers meet our performance criteria to be EECA approved business partners, they can access funding to help their clients become more energy efficient.

Purpose

The Top 200 and Next 1000 programmes are EECA's flagship business programmes and are designed to maximise energy efficiency, contribute to national energy intensity and reduce greenhouse gas emissions.

The purpose of the Top 200 programme is to directly engage with businesses in a holistic manner, building long-term relationships that enable engagement with senior management and internal operational staff to better achieve efficiency and renewable energy improvements.

The Next 1000 programme aims to access energy efficiency and renewable energy benefits indirectly through Programme Partners (i.e. without the same resource intensive one-to-one approach).

Key components

While the method for engagement is different, the products and services EECA uses are the same for both programmes and are tailored to the needs of a business depending on where it is in its energy management journey (shown in the diagram below).

The programme uses a number of different interventions to develop long-term multi-site partnerships and work with business leaders to identify opportunities to be more efficient with their energy use.

Feasibility tools:

- Energy Management Plan – Establishing an energy management framework consistent with the requirements of ISO50001.
- One 2 Five – An in-depth session for business leaders and operational staff examining the business approach to energy. Provides a benchmark against similar businesses and an action plan for further development.
- Monitoring and Targeting – Monitoring and targeting all energy using systems and processes, on industrial and commercial sites.
- Audits – Report to identify and to broadly quantify energy efficiency opportunities across a site.
- Feasibility Study and Business Case Development – Assessment of the technical and financial feasibility of an energy efficiency or renewable energy project at design phase.
- Industrial and Process Design Advice - Design advice on the energy efficiency of a proposed new system in its design phase. This includes process heat, pumping and fan, compressed air, and industrial refrigeration systems.
- Commercial Building Performance Advice - Concept and detailed design advice for commercial building construction and commissioning.

Development tools:

- Crown Loans – Loans for energy efficiency upgrades and installation of renewable energy systems in the public sector.

- Technology Demonstration – Support for the implementation of proven underutilised technologies that with wider adoption could improve sector energy performance.
- Graduate Programme - Programme to provide additional skilled resource to overcome resource limitations in client businesses.

Review tools:

- Energy System Optimisation – Optimisation of systems including HVAC systems, lighting systems, building management systems, process heat (boilers, furnaces, steam and hot water systems), compressed air systems, and refrigeration systems.
- NABERSNZ – System for rating the energy efficiency of office buildings.

Businesses with higher energy use are targeted for participation in the Top 200 and Next 1000 programmes, but the actual agreements and business partnerships entered into depend on where each firm's capability and its openness to energy efficiency. These firms tend to be spread across the industrial and commercial sectors.

9.2 Appendix Two – Top 200 cost-benefit analysis summary

1 Cost Data

- Direct EECA costs of establishing and running Top 200 during 2014/15 and 2015/16 and future commitments are taken from EECA records. Costs for 2013/14 have been estimated at $3 million and included to reflect measured energy savings occurring in 2014/15 as a result of the pilot programme.
- Third party costs are set at 150% of EECA grant money which is near the average for projects to date and EECA's maximum contribution to total project costs of 40%.

2 Energy Savings Data

Energy savings are determined from two sources:

- Measured incremental energy savings in 2014/15 and 2015/16 are provided by client companies and programme partners for implemented projects and recorded in SalesLogix. As Top 200 programme savings in 2014/15 imply some EECA activity in previous years, EECA costs for 2013/14 have been included in the analysis. Some measured energy savings from 2014/15 in SalesLogix were excluded on the basis of not being related to long term partnership engagement typical of the Top 200 programme.
- Remaining energy savings anticipated from direct engagement projects committed during 2014/15 and 2015/16 but not yet implemented. This data has been taken from the Top 200 KPI spreadsheet after being extracted from client company contract schedules and is equivalent to 0.83 PJ (231 GWh) per year after accounting for reported figures.
- Because of the range of project activities included in the contract schedules, the average duration of the energy savings has been set at ten years. This is consistent with the Lower Carbon Meat and Dairy programme analysis and a previous CBA carried out in 2014.
- Associated carbon dioxide emission reductions have been valued at the average value of an NZU in each year of the programme and at $25 per tonne thereafter.

	2014	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Energy Saved PJ							
Measured	0.00	0.29	0.72	0.72	0.72	0.72	0.72
Committed	0.00	0.00	0.00	0.28	0.66	0.79	0.83
	0.00	0.29	0.72	1.00	1.38	1.50	1.55
CO2 Reduction tpa	0	17025	37794	52719	72725	79425	81647
Expenditure $ million							
EECA							
Expenditure	-3.00	-3.48	-5.36	0.00	0.00	0.00	0.00
Commitments Outstanding	0.00	0.00	0.00	-4.86	-1.63	-0.54	0.00
Third Party Expenditure	-3.00	-2.97	-5.44	-7.29	-2.44	-0.81	0.00
Value of Energy Saved $ million	0.00	4.66	11.86	16.54	22.82	24.92	25.62
Value of Emissions Reduction $ million	0.00	0.17	0.57	1.32	1.82	1.99	2.04

3 Outputs

- Based on the activities to date, the programme has achieved a strong net present value of nearly $160 million and a benefit-cost ratio of 4.9:1.
- The public benefit to public cost ratio is in the order 0.74 based on EECA's costs to date and the carbon dioxide emissions reductions from the mix of fuels affected.

Cash Flow: $2016 million	PV 2016 $M	2014	2015	2016	2017	2018	2019	2020
EECA Costs	-18.836	-2.927	-3.479	-5.361	-4.858	-1.627	-0.539	0.000
Third Party Costs	-21.570	-2.927	-2.973	-5.436	-7.286	-2.440	-0.809	0.000
Energy Saved	182.947	0.000	4.664	11.858	16.541	22.818	24.920	25.617
CO2 Reduction	13.947	0.000	0.170	0.567	1.318	1.818	1.986	2.041
Net Present Value	156.487							
Ratios								
All Benefits/All Costs	4.87							
Public Benefits/Public Costs	0.74							
Public Benefits/Private Benefits	0.08							
Private Costs/Public Costs.	1.15							

- Due to the mix of energy savings measures included in the programme the average life of the savings has been assumed to be ten years. A life of five years reduces the benefit cost ratio to 3.0 and the public benefit to public cost ratio to 0.44.
- The ratio of private costs to public costs is 1.15, reflecting EECA's maximum contribution to total project expenditure.

The programme demonstrates good overall results from its first years of activity based on relatively robust input data. There are some provisos however:

- The only quantifiable public benefit is the reduction in carbon dioxide emissions, resulting in a public benefit to public cost ratio of 0.77. Unity will be reached if the future carbon dioxide price is assumed to be $33 per tonne.
- Identifying the interface between the start of the Top 200 programme and its precursors has proven challenging in terms of quantifying EECA programme expenditures and associated energy savings. This is mainly due to the pre-existing engagement with several of the large energy users.
- EECA expenditure in 2013/14 has been estimated and unrealised energy savings from future project commitments are based on contract schedule estimates.

9.3 Appendix Three – Next 1000 cost-benefit analysis summary

1 Scope

This is a provisional analysis of the Next 1000 programme based only on committed funding and energy savings recorded for 2014/15 and 2015/16. Being based on commitments it is not a true cash flow analysis and makes no judgment on actual energy savings resulting from the commitments. The following programmes are bundled within the wider Next 1000 programme:

- Energy Management Plan
- Energy System Optimisation
- Monitoring and Targeting
- Energy Audits
- Design Advice
- Audit and Works (including capital grants)
- Lighting Audit and Works (including capital grants)

2 Data Sources and Key Assumptions

- Committed EECA and third party costs and associated energy savings are aggregated from the Programme Partners' reports at the time of approving specific projects.
- Prospective energy savings have not been de-rated for this provisional analysis.
- The energy mix is assumed to be the same as that in the Top 200 programme.
- The average duration of the energy savings has been set at ten years. This is consistent with the Top 200 analysis which employs a similar array of project types.
- Associated carbon dioxide emission reductions have been valued at the average value of an NZU in each year of the programme and at $25 per tonne thereafter.

	2015	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*
Energy Saved PJ							
Committed	0.00	0.15	0.25	0.25	0.25	0.25	0.25
CO2 Reduction tpa	0	7834	13368	13368	13368	13368	13368
Expenditure $ million							
EECA							
Grants	-4.24	-2.15	-0.12	-0.12	-0.04	0.00	0.00
Other Direct Costs	-0.70	-0.87	0.00	0.00	0.00	0.00	0.00
Third Party Expenditure	-11.88	-1.69	0.00	0.00	0.00	0.00	0.00
Value of Energy Saved $ million	0.00	2.46	4.19	4.19	4.19	4.19	4.19
Value of Emissions Reduction $ million	0.00	0.12	0.33	0.33	0.33	0.33	0.33

3 Outputs

- Should the commitments come to full fruition, the programme activities during these two years will yield a net present value of $10 million and a benefit-cost ratio of 1.44:1. If the 2015/16 commitments are taken alone the ratio will double due to the much reduced level of capital grants.
- The public benefit to public cost ratio is in the order 0.28 based on two year commitments. This increases marginally if 2015/16 commitments are taken alone.

Cash Flow: $2016 million	PV 2016 $M	2015	2016	2017	2018	2019	2020	2021
EECA Costs	-8.553	-4.941	-3.014	-0.123	-0.123	-0.037	0.000	0.000
Third Party Costs	-14.414	-11.894	-1.687	0.000	0.000	0.000	0.000	0.000
Energy Saved	30.667	0.000	2.458	4.194	4.194	4.194	4.194	4.194
CO2 Reduction	2.365	0.000	0.118	0.334	0.334	0.334	0.334	0.334
Net Present Value	10.065							
Ratios								
All Benefits/All Costs	1.44							
Public Benefits/Public Costs	0.28							
Public Benefits/Private Benefits	0.08							
Private Costs/Public Costs.	1.69							

- Due to the mix of energy savings measures included in the programme, the average life of the savings has been assumed to be ten years. A life of five years reduces the benefit cost ratio to 0.84:1 and the public benefit to public cost ratio to 0.16.